The role of Photosystem I polyopeptides involved in the photoreduction of NADP⁺.

J. Hanley, G. Li, P. Heathcote and M.C.W. Evans
Dept. of Biology, University College London, Gower St. London WC1E 6BT. UK.

Photosystem I is a membrane bound multigrain-pigment complex consisting of a reaction center (P700), a primary electron acceptor (A⁺), an intermediate redox component (A), and three iron-sulfur centres FeS₃. The reaction center contains 2 οxidizable centres FeS₃ and FeS₄. Removal of the FeS₄, apoprotein is monitored by measuring the reduction of P700⁺ by back reaction from electron acceptors following laser excitation. P700⁺ is restored to FeS₃ with FeS₄ on illumination of the core protein with FeS₄ apoprotein. EPR data confirms the restoration of low temperature FeS₄ photoreduction in reconstituted PSI particles. Digitonin-extracted PSI from NADP⁺-treated isolated chloroplasts was used to determine the oxidation of NADP⁺ photoreduction in reconstituted PSI. A ratio of 2 to 1 of P700⁺ 10 ms after readdition from FeS₄ indicates that about 90% of the original NADP⁺ photoreduction activity remains. There are a number of polyopeptides involved in the reconstitution of NADP⁺ photoreduction and the function of these will be discussed.

THE SUBUNIT STOICHIOMETRY OF PHOTOSYSTEM I REACTION CENTER.

Tetsuo Hiyama, Takeishi Ohya, Shin-ichi Kobayashi, Masaaki Senda* and Hitoshi Nakamoto, Biochem. Dept., Saiitama Univ., Urawa 338 and *JASCO Inc., Hachioji 192, Japan

Quantitative amino acid analysis using hydrolysis and debasement (Aninochrome) of electroblotted PVDF membrane was applied for SDS-PAGE resolved Photosystem I reaction center subunits for the determination of stochiometry. Highly specific and quantitative ELISA technique using antibody raised against each protein was also employed to determine the stoichiometry of Photosystem I subunits. The 1:1 ratio was obtained for PsaA, PsaB, PsaC, PsaD and PsaE in highly purified preparations from spinach chloroplasts. On the other hand, the crude preparations, a ratio of more than three molecules per P700 was observed for PsaE, while other subunits remained the same.

CHARACTERIZATION OF PsaE GENE PRODUCT

Teruhito Takabe, Yukimoto Iwasaki, Yoshito Tanaka and Yuko Numata, Dept. of Chem., Fac. of Sci. & Technol., Meio Univ., Nagoya 468, Japan

The PSI complex prepared from cucumber cotyledons, which contains 80 chlorophylls per P700 and eight polyopeptides of PsaA/PsaB (65/63 kDa), PsaD (20 kDa), PsaE (19.5 kDa), PsaF (18.5 kDa), PsaG (17.6 kDa) and an unknown gene (17.5 kDa) has been shown to catalyze the light-dependent transfer of electrons from plastocyanin (PC) to ferredoxin. The PsaE gene product was easily depleted from the complex that inactive the light-dependent electron transfer from PC to photooxidized P700. PC was specifically cross-linked to the PsaE gene product of the PSI complex. Kinetic properties of the cross-linked adducts were studied. cDNA of PsaE gene was isolated from cucumber and sequenced. The interactions between PC and PSI complex were discussed based on its nucleotide sequence.